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Title

Validity and responsiveness of the French version of the Örebro Musculoskeletal Pain Screening Questionnaire in chronic low back pain

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Abstract

Purpose: The assessment of a broad range of biopsychosocial aspects is important in the rehabilitation of patients with chronic low back pain (CLBP) for the prediction of outcome as well as for evaluation. The objective of this study was to test the responsiveness, construct validity and predictive value of the Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ) compared to other instruments widely used to assess biopsychosocial aspects in patients with CLBP.

Methods: 111 patients with CLBP admitted to an inpatient rehabilitation completed a set of questionnaires on biopsychosocial aspects at baseline and at discharge. Ninety-eight patients responded at three months for an assessment of the return to work status. Responsiveness of the OMPSQ, the ability to detect change in the construct of interest, was investigated by a set of hypotheses on correlations with widely used questionnaires. We tested the hypothesis that the changes in the OMPSQ would vary along with the responses in the Patient's Global Impression of Change. Prediction of disability at discharge, work status at three months and time to return to work was evaluated with linear, logistic and cox regression models.

Results: The OMPSQ showed good predictive values for disability and return to work and construct validity of the instrument was corroborated. Seventy-nine percent of our hypotheses for responsiveness could be confirmed, with the OMPSQ showing the second highest change during the rehabilitation.

Conclusions: The OMPSQ can also be applied in patients with CLBP, but for the assessment of change in psychosocial variables one should add specific questionnaires.

Key words

Questionnaires; psychometrics; low back pain, prognosis; rehabilitation;

Manuscript

Introduction

Chronic low back pain (CLBP) is a substantial burden for the individual and the society. Individuals with CLBP often have activity limitations and participation restrictions leading to productivity losses with high economic consequences for the society [1]. Given that for these chronic situations simple, monomodal medical interventions are most often not sufficient, biopsychosocial rehabilitation is paramount for chronic problems [2]. In the context of chronic pain, the IMMPACT group recommends to use tools covering the six core outcomes domains (pain, physical functioning, emotional functioning, participant ratings of improvement and satisfaction with treatment, symptoms and adverse events, and participant disposition) [3]. One potentially interesting tool that briefly assess several psychosocial factors is the Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ). The OMPSQ was developed to predict chronic problems in patients with acute pain [4, 5], and has been translated into French [6]. It has been evaluated for its predictive value for chronic pain, disability and work absence in patients with acute or sub-acute back pain [6] and its reliability in patients with CLBP [7]. This short questionnaire consists of 25 items and covers a range of key psychosocial constructs, known to be risk factors for chronicity, such as depression, fear avoidance beliefs, coping strategies, pain and disability, stress, job satisfaction, and self-perceived risk for chronicity. The OMPSQ is widely used, and recommended in several clinical guidelines as a screening tool for yellow flags in acute back pain [8-11]. Its value in predicting long-term sick leave, sickness presenteeism and disability pension has also been explored among employees during a follow-up period of 2 years. It has been found to have a high sensitivity (0.89), a low specificity (0.46) and a moderate area under the receiver operating characteristic curve (AUC = 0.81) for the prediction of long-term sick leave [12]. Because of its format and the time-window for responding (e.g. the last week for most of the questions), the OMPSQ can also be used as an outcome measure in intervention studies. Hence it is important to explore its psychometric properties to detect change over time. To the best of authors' knowledge, it was never explicitly analysed for the individuals of working age with CLBP. Therefore, within a prospective longitudinal observational study including individuals at working age with CLBP (>3 months) admitted to an inpatient rehabilitation clinic, we evaluated the responsiveness and sensitivity to change of the OMPSQ. Furthermore, we explored the predictive value of the OMPSQ for the return to work.

Methods

Participants

Participants were patients with CLBP admitted to a rehabilitation clinic in the French speaking part of Switzerland between February 2011 and October 2013. Inclusion criteria were (1) LBP for more than three months verified by a medical doctor, (2) between 18 and 65 years old, and (3) ability to read French. Patients were excluded if they had alcohol dependence, a severe psychiatric illness, malignancy, an acute physical problem, spinal infection (e.g. spondylodiscitis) or a severe scoliosis with an angle of more than 40°. The study was approved by the local ethics committee and followed the ethical principles for medical research of the Declaration of Helsinki. For this

prospective cohort study, 206 inpatients were consecutively contacted and 129 patients met the inclusion criteria and provided informed consent (Fig1).

The multidisciplinary rehabilitation is an inpatient program including physical reconditioning, group therapy, individualized cognitive behavioural approach and vocational training. The program lasts about four weeks. Most patients are admitted after an accident (on average after 9 months) with a total incapacity for work.

Data collection

Various key constructs [3] were assessed with self-reported questionnaires in paper form using a digital pen. Data were automatically stored in a data-base. French versions of all questionnaires were available.

A battery of questionnaires was presented at entry into the clinic (baseline, t0) and in the last two days before discharge at the end of the rehabilitation (t1), with a time interval of 23 ± 9 days. Patients completed all questionnaires in a quiet room of the rehabilitation clinic in the presence of a scientific collaborator not involved in the treatments of patients. Three months after the end of the rehabilitation (t2), we called the patients to assess the work status. The questionnaires assessed functional capacities (Oswestry Disability Index - ODI [13], fear of movement / (re)injury (Tampa Scale for Kinesiophobia - TSK [14]), attitudes of the participants towards pain (Situational Pain Scale - SPS), fear-avoidance beliefs (Fear-Avoidance Beliefs Questionnaire - FABQ [15]), coping strategies (Coping Strategies Questionnaire - CSQ [16]), anxiety and depression (Hospital Anxiety and Depression Scale - HADS [17]) and quality of life (EuroQol-5D /EQ-5D [18]). Pain intensity was evaluated by a visual analogue scale (VAS; 0=no pain; 10=the worst pain that I can imagine) and five questions (worst pain during the last 24h; least pain during the last 24h; average pain during the last 24h; current pain; global pain) [19].

At end of the rehabilitation (t1), the same questionnaires were provided in the same order except that the patient global impression of change (PGIC) [20] (http://www.mapi-trust.org for the French version) was added. For the PGIC, the options are “very much improved”, “much improved”, “minimally improved”, “no change”, “minimally worse”, “much worse” and “very much worse”.

The OMPSQ has 25 items. Items 16, 17 and 21 to 25 are reversely scored. The score for the item 5 (the number of painful sites) is multiplied by two. The sum of individual items 5 to 25 gives the OMPSQ score.

The SPS, a measure of mental representation of pain, has 18 items for which the participant needs to imagine him or herself in a situation (e.g., “I stub my toe on a chair leg”) and rate the pain intensity for the situations described (0 to 3). It has been validated in adults with or without chronic pain [21, 22]. Its reliability was good in CLBP [7].

Data analyses

For analysis, data were anonymized and exported to STATA (StataCorp. LP College Station, TX, USA).

The scores were determined following the guidelines of the instruments for treating missing values. Missing values in the OMPSQ were imputed with the mean value of the other items, as recommended by the author of the original questionnaire [5]. For all other questionnaires, we discarded a questionnaire if more than 20% of the items were missing and we imputed the mean value of the non-missing items into the remaining items~~, except for the FABQ, where missing items were replaced with the value for the response option “unsure”~~.

Correlation among the tests

For construct validity, correlations between the OMPSQ and the other different tests was calculated using Spearman's rank correlation coefficients with 95% CI for the baseline values of the 111 patients that still participated at discharge. A coefficient between 0.1 and 0.3 was considered as small, > 0.3 - 0.5 as moderate and > 0.5 as large [23]. We expected no correlation with the SPS and the CSQ sub-scales, but at least small correlations in the range of 0.1 to 0.5 with all the others.

Predictive value of the OMPSQ

To compare the predictive value of the OMPSQ with the other questionnaires, univariable models for each questionnaire and adjusted models (controlled for age and gender) were calculated. For the different outcomes, we calculated the following models: (a) logistic regression with the dependent variable non-return to work at 3-months, and (b) cox regression for the time to return to work were calculated. Hazard ratios and their corresponding 95% CI were presented, as well as survival plots with defining three groups of risk for persistent problems (low risk: OMPSQ score < 71, moderate risk: 71-105, and high risk > 105) [6].

To test the hypothesis that the OMPSQ has predictive value beyond pain and disability, we fitted a model including VAS, ODI and the OMPSQ.

Responsiveness

COSMIN panel defines responsiveness as "the ability of an instrument to detect change over time in the construct to be measured" [24]. Because anxiety, fear-avoidance beliefs, pain intensity and disability are part of the OMPSQ, we hypothesized that change in OMPSQ would be correlated with the change of the HADS, FABQ, pain intensity and ODI. We did not expect correlations with the CSQ. Furthermore, we hypothesized that patients who reported improvement on the PGIC show more change in the OMPSQ compared to patients who reported no or less change on the PGIC. Following recommendations [24], at least in 75% of the analyses the results should be in agreement with these 14 hypotheses. Spearman's rho correlations were calculated.

Mean changes, i.e. score differences between follow-up and baseline, as well as effect sizes (Cohen's d for dependent samples was calculated by dividing the pre-post difference by the baseline standard deviation) with 95% confidence interval (CI) [23] were calculated. For the SPS, the scores in logits (interval scale) from a Rasch-analysis were used for the analyses as described elsewhere [22].

Results

Of the 129 patients included, 111 filled out the questionnaires at discharge and 98 responded concerning their work status three months after the discharge (Fig1). Patients who withdrew from filling in questionnaires at discharge had higher values on the coping strategies praying subscale (effect size 0.59, p = 0.022), and higher fear avoidance beliefs concerning physical activity (effect size 0.83, p = 0.001) at baseline. Patients who were not available for three-month follow-up were younger (effect size 0.46, p = 0.028).

The questionnaires were very complete. There were less than two percent of missing values both at baseline and at discharge. At t0, there was one missing value for the current pain, one patient had more than 20% of missing values in the physical activity subscale of FABQ and three patients had more than 20% of missing values in the work subscale of the FABQ. At t1, there was also one missing value for the current pain, two patients had more than 20% of missing values in the TSK and FABQ and, three patients had no valid SPS questionnaires. In three questionnaires (CSQ-reinterpretation, CSQ-prayer and HADS-depression), one patient had more than 20% of missing values.

The mean age of our sample was 42.8 years (sd 9.2) and there was a majority of men (101/129). Other patients' characteristics are presented in Table 1. At entry, a vast majority were either not working or on sick leave longer than 30 days (84%) during the last 12 months before admission to the rehabilitation.

Correlation among the tests

For construct validity, our hypotheses were confirmed for the correlation with SPS (< 0.3) and for pain intensity, ODI, HADS-depression, EQ-5D FABQ and TSK (0.3-0.5). We found a correlation higher than 0.5 for the CSQ-catastrophizing (>0.5). Overall, 18 out of 19 (95%) of our hypotheses were correct; confirming construct validity See supplementary file 1.

Predictive value of the OMPSQ

The OMPSQ had good predictive value for return to work status at three months and for the time to work resumption. The Table 2 shows that the OMPSQ had the best predictive value compared to other questionnaires. By fitting a multivariable model including VAS, ODI and the OMPSQ, we observed that the OMPSQ had a predictive value beyond pain and disability (i.e. the odds ratio did not decrease, see Table 2). The three categories of the OMPSQ showed distinct Kaplan-Meyer curves (Fig2).

Responsiveness

Overall, the changes during the rehabilitation (pre-post differences) were small. Compared to the other questionnaires only the question about the worst pain intensity had a higher effect size than the OMPSQ (Table 3). For our a-priori formulated hypothesises, 11 out of 14 (79%) were corroborated (Table 4 and Table 5). We found a moderate correlation with the PGIC (Table 4). Patients who noted a larger improvement on PGIC had higher improvements in the OMPSQ ($p<0.0001$); see Table 5.

Discussion

In this longitudinal cohort study of patients with CLBP, we found that the OMPSQ could be used to predict outcomes such as disability and return to work during rehabilitation. Also the construct validity of the OMPSQ was confirmed. Based on our data, the responsiveness of the OMPSQ was small to moderate, which might be due to the lack of strong changes during the rehabilitation.

Our results for the predictive value of the OMPSQ for persistent problems in CLBP are similar to the results of studies in patients with acute or subacute problems. This indicates that the OMPSQ can also be used in patients with chronic problems.
In addition, we observed that the OMPSQ could be used to predict return to work. We could not confirm all our hypotheses relating to responsiveness. One reason might be that the OMPSQ is a conglomerate score of different constructs, which we correlated with unidimensional scales. Furthermore, the small to moderate responsiveness has to be seen in the light of the generally low changes during a rehabilitation of CLBP and the self-reported global impression of change showing that a large proportion of patients is not improving. Nevertheless, the OMPSQ showed the largest improvement during the rehabilitation.

This study has several clinical implications. There is a need for comprehensive tools that are not only reliable and valid, but also feasible and easy to use in clinical practice. Hence, tools should be easy to score and the scores should be meaningful and interpretable. Furthermore, the questionnaires should not be a burden for the patients. Amongst various available instruments, the OMPSQ is one such instrument. A similar, but shorter questionnaire (StartBack, consisting of items covering for referred leg pain, comorbid pain, disability, bothersomeness, catastrophizing, fear, anxiety, and depression.) was evaluated for its responsiveness and the authors concluded that this tool could be used to measure recovery from back pain [25]. Because their method was different, a comparison of the responsiveness of the StartBack compared to the OMPSQ, calculated with the same method would be informative.

Our findings suggest that a measure covering the multidimensional complexity in CLBP is associated with high predictive strength. The OMPSQ performed well as a predictive outcome measure in rehabilitation and for return to work. The OMPSQ could replace several unidimensional questionnaires and provide a comprehensive overview of the inpatients with CLBP treated in a rehabilitation clinic. If the OMPSQ shows problem in specific domains, for example in the items covering fear avoidance beliefs, one could then use a specific questionnaire to assess in-depths the problem. There is evidence that using the different sub-dimensions for the prediction might be better than using the summary score [26].
Although the responsiveness was only moderate in this study, the OMPSQ may have a role to play in evaluating patients during rehabilitation.

A strength of this study is the use of a large number of questionnaires covering all relevant psycho-social variables in a large sample. All questionnaires were very well completed with less than two percent of missing values. A limitation of cohort studies is the loss to follow-up or withdrawals. Although the total sample size of this study is

good (n = 129) and drop out is acceptable, the number of patients in particular PGIC categories was low for subgroup analysis. Another point was that the patients included in the study had to be able to read French, and hence are not representative of all the patients treated in the rehabilitation clinic.

Conclusion

The predictive value and concurrent validity of the OMPSQ, applied to patients with chronic low back pain in a rehabilitation clinic, are good. The responsiveness is small to moderate and needs to be further explored using an improved treatment programme that should be more effective in this patient group.

Conflict of Interest: The authors declare that they have no conflict of interest.

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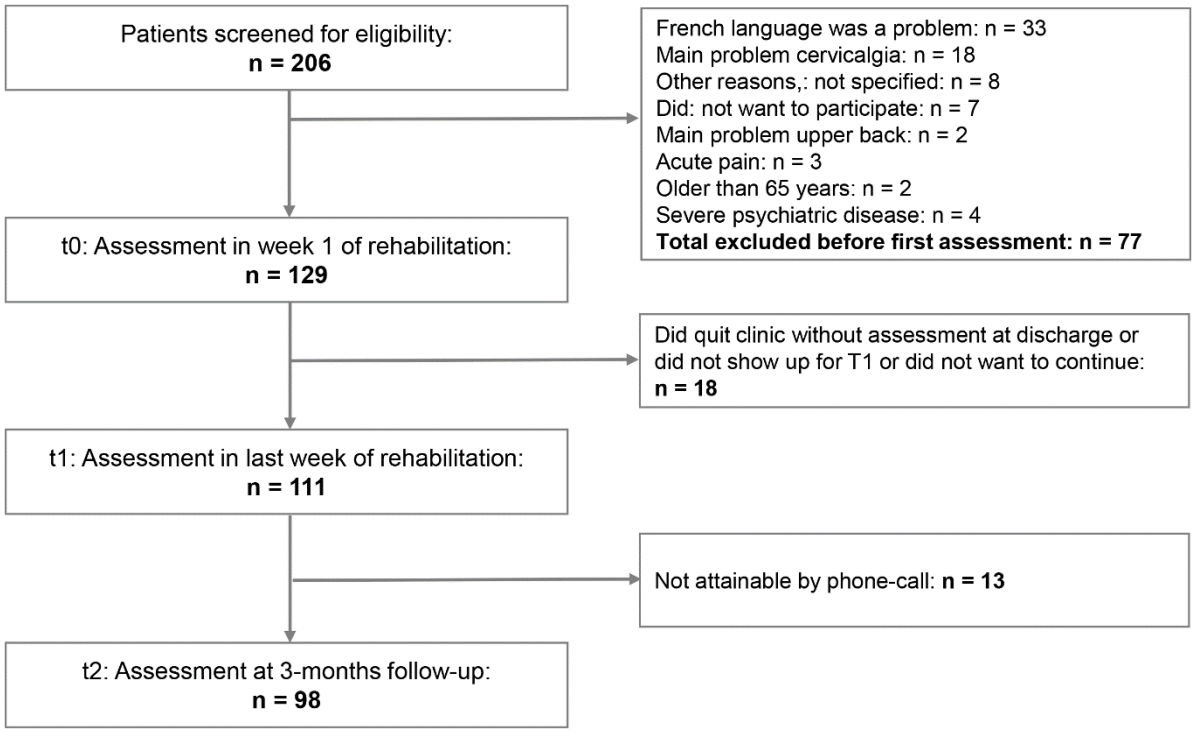
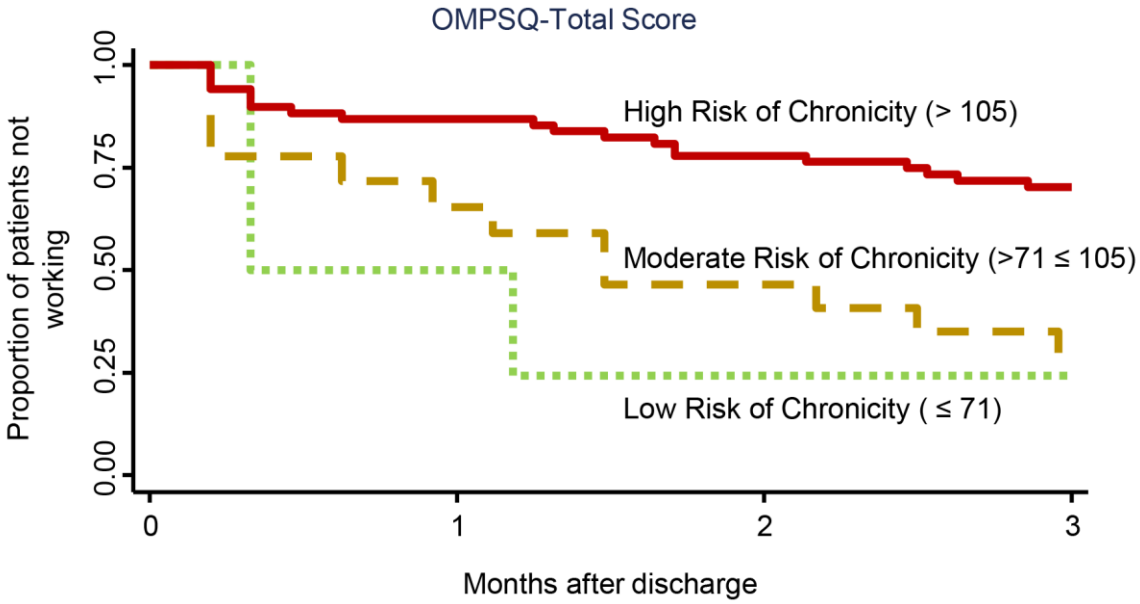
Figure captions

Fig1 Flow chart of the study participants
Fig2 Kaplan-Meier curve of the time to return to work, stratified for three risk groups based on the Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ)


Patients screened for eligibility:
n = 206
French language was a problem: n = 33
Main problem cervicalgia: n = 18
Other reasons,: not specified: n = 8
Did: not want to participate: n = 7
Main problem upper back: n = 2
Acute pain: n = 3
Older than 65 years: n = 2
Severe psychiatric disease: n = 4
Total excluded before first assessment: n = 77
t0: Assessment in week 1 of rehabilitation:
n = 129
Did quit clinic without assessment at discharge or did not show up for T1 or did not want to continue:
n = 18
t1: Assessment in last week of rehabilitation:
n = 111
Not attainable by phone-call: **n = 13**
t2: Assessment at 3-months follow-up:
n = 98


OMPSQ-Total Score
Proportion of patients not working
0.00
0.25
0.50
0.75
1.00
0
1
2
3
Months after discharge
High Risk of Chronicity (> 105)
Moderate Risk of Chronicity (>71 ≤ 105)
Low Risk of Chronicity (≤ 71)

Suplementary file. Table S1

Variables	rho (96% CI)	Hypothesis confirmed
Oswestry Disability Index	0.74 (0.64 to 0.81)	yes
Global Pain	0.67 (0.55 to 0.76)	yes
Average pain last 24 hours	0.63 (0.5 to 0.73)	yes
EQ-5d FR Utility Index	-0.62 (-0.73 to -0.5)	yes
Worst pain last 24 hours	0.58 (0.44 to 0.69)	yes
Current Pain	0.58 (0.44 to 0.69)	yes
Lowest pain last 24 hours	0.56 (0.42 to 0.68)	yes
EQ-5D VAS 0 to 100	-0.52 (-0.64 to -0.37)	yes
HADS Depression	0.52 (0.37 to 0.65)	yes
FABQ-Physical Activity	0.48 (0.33 to 0.62)	yes
HADS Anxiety	0.43 (0.27 to 0.57)	yes
FABQ-Work	0.43 (0.26 to 0.57)	yes
Tampa Scale	0.42 (0.26 to 0.56)	yes
CSQ Praying/Hoping	0.29 (0.11 to 0.45)	yes
CSQ Ignoring	-0.23 (-0.4 to -0.04)	yes
CSQ Diverting Attention	0.15 (-0.04 to 0.33)	yes
CSQ Reinterpretation	-0.09 (-0.27 to 0.1)	yes
CSQ Catastrophising	0.63 (0.5 to 0.73)	no
SPS (logit)	0.06 (-0.13 to 0.24)	yes

Table 1. Characteristics of the participants

Variable	All included at baseline, n = 129 n (%) if not stated else	All with discharge values; n = 111 n (%) if not stated else	All with follow-up values; n = 98 n (%) if not stated else
Age:			
Mean (sd)	42.8 (9.2)	43.5 (12.8)	44.0 (12.8)
Min to max	20-to-65	20-to-65	20-to-65
Language:			
French	84 (65%)	75 (68%)	65 (66%)
Other	45 (35%)	36 (32%)	33 (33%)
Education:			
No degree	2 (2%)	2 (2%)	1 (1%)
Obligatory school	33 (26%)	25 (23%)	23 (23%)
Professional certificate	78 (60%)	71 (64%)	64 (65%)
High school	4 (3%)	4 (4%)	3 (3%)
Professional education	5 (4%)	4 (4%)	3 (3%)
University	7 (5%)	5 (5%)	4 (4%)
Life Situation:			
Living alone	38 (29%)	31 (28%)	30 (31%)
Living with a partner	89 (69%)	78 (70%)	68 (69%)
No information	2 (2%)	2 (2%)	
Having children			
Having children	91 (71%)	79 (71%)	70 (71%)
Not having children	36 (28%)	32 (29%)	28 (29%)
No information	2 (2%)		
Work Situation			
Full-time working	72 (56%)	61 (55%)	55 (56%)
Part-time working	17 (13%)	17 (15%)	15 (15%)
Unemployed because of pain	22 (17%)	16 (14%)	16 (16%)
Unemployed because of other reasons	15 (12%)	14 (13%)	9 (9%)
Disability pension	3 (2%)	3 (3%)	3 (3%)
Sick days (last 12 months)			
0 day	15 (12%)	13 (12%)	11 (12%)
1-30 days	6 (5%)	5 (5%)	4 (4%)
>30 days	68 (53%)	60 (54%)	55 (55%)
Not working	40 (31%)	33 (30%)	28 (28%)
Pain Region:			
Low back pain	129 (100%)	111 (100%)	98 (100%)
Upper back pain	38 (29%)	35 (32%)	32 (33%)
Leg pain	49 (38%)	38 (34%)	34 (35%)
Shoulder pain	24 (19%)	19 (17%)	17 (17%)
Neck pain	21 (16%)	17 (15%)	16 (16%)
Level of Average Pain Severity			
Mild	44 (34%)	39 (35%)	35 (36%)
Moderate	67 (52%)	57 (51%)	49 (50%)
Severe	18 (14%)	15 (13%)	14 (14%)

sd = Standard deviation; Level of pain severity: mild: >0 <40; moderate: ≥ 40 <70; severe: ≥ 70 on a scale from 0 to 100.

Table 2. Prediction of disability at discharge and return to work status at follow-up (standardized values)

Variable	Oswestry Coefficient (95% CI)	Return to work Odds Ratio (95% CI)	Time to return to work Hazard Ratio (95% CI)
Univariable predictions:			
OMPSQ Total Score	22.32 (17.61 to 27.03)	0.05 (0.01 to 0.19)	0.18 (0.1 to 0.34)
Worst Pain 24h	19.6 (14.48 to 24.72)	0.35 (0.14 to 0.84)	0.44 (0.25 to 0.77)
Lowest Pain 24h	15.07 (9.42 to 20.72)	0.42 (0.18 to 0.99)	0.5 (0.25 to 0.98)
Average Pain 24h	17.84 (12.49 to 23.19)	0.28 (0.12 to 0.69)	0.39 (0.21 to 0.73)
Current Pain	16.49 (10.93 to 22.05)	0.38 (0.16 to 0.87)	0.44 (0.24 to 0.81)
Global Pain	17.58 (12.2 to 22.96)	0.31 (0.13 to 0.75)	0.44 (0.25 to 0.79)
ODI	29.62 (26.71 to 32.53)	0.2 (0.08 to 0.52)	0.32 (0.17 to 0.59)
TSK	10.47 (4.46 to 16.48)	0.2 (0.07 to 0.51)	0.32 (0.17 to 0.61)
SPS logit	5.71 (-0.53 to 11.95)	1.05 (0.46 to 2.39)	0.99 (0.57 to 1.74)
FABQ-PA	12.56 (6.64 to 18.48)	0.23 (0.09 to 0.59)	0.37 (0.21 to 0.67)
FABQ-Work	8.1 (1.9 to 14.3)	0.14 (0.05 to 0.39)	0.28 (0.16 to 0.48)
CSQ Diverting Attention	7.7 (1.54 to 13.86)	0.69 (0.31 to 1.52)	0.77 (0.43 to 1.37)
CSQ Catastrophizing	14.36 (8.65 to 20.07)	0.26 (0.1 to 0.65)	0.37 (0.2 to 0.71)
CSQ Ignoring Pain	-1.86 (-8.18 to 4.46)	1.44 (0.64 to 3.25)	1.35 (0.75 to 2.43)
CSQ Reinterpretation	1.32 (-5.01 to 7.65)	1.03 (0.46 to 2.29)	1.06 (0.6 to 1.9)
CSQ Praying/Hoping	9.75 (3.7 to 15.8)	0.53 (0.23 to 1.21)	0.64 (0.35 to 1.17)
HADS Depression	14.96 (9.3 to 20.62)	0.32 (0.13 to 0.78)	0.39 (0.2 to 0.76)
HADS Anxiety	7.42 (1.25 to 13.59)	0.45 (0.19 to 1.07)	0.53 (0.27 to 1.04)
EQ5D-VAS	15.37 (9.75 to 20.99)	0.35 (0.14 to 0.84)	0.43 (0.23 to 0.82)
EQ5D-FR-Index	19.52 (14.39 to 24.65)	0.24 (0.1 to 0.61)	0.36 (0.19 to 0.7)
Multivariable Predictions:			
OMPSQ Total Score		0.02 (0.00 to 0.19)	0.15 (0.06 to 0.39)
Worst Pain 24h		1.31 (0.34 to 5.10)	0.85 (0.43 to 1.70)
ODI		1.61 (0.30 to 8.71)	1.44 (0.52 to 3.96)

95% CI = 95% confidence intervals. OMPSQ = Orebro Musculoskeletal Pain Screening Questionnaire; ODI = Oswestry Disability Index; TSK = Tampa Scale for Kinesiophobia; SPS = Situational Pain Scale; FABQ-PA = Fear Avoidance Beliefs Questionnaire, subscale for Physical Activity; CSQ = Coping Strategies Questionnaire; HADS = Hospital Anxiety and Depression Scale. Univariable prediction: only the given variable in the models. Multivariable prediction: OMPSQ Total Score, Worst pain 24 h and Oswestry Disability Index in the models.

Table 3. Mean values at baseline and at discharge; changes from baseline to discharge and effect sizes

Variable	Mean Baseline (sd)	Mean Discharge (sd)	Mean Change (sd)	Effect Size (95% CI)
OMPSQ total score	121.1 (29.4)	113.1 (30.1)	-8.0 (18.6)	0.3 (0.2 to 0.4)
Worst Pain 24h	62.2 (23.2)	55.6 (25.9)	-6.6 (21.7)	0.3 (0.1 to 0.5)
Lowest pain 24h	33.6 (21.9)	35.0 (26.5)	1.4 (19.8)	0.1 (0.2 to -0.1)
Average pain 24h	45.6 (21.2)	45.0 (25.4)	-0.6 (19.2)	0.0 (-0.1 to 0.2)
Current pain	47.8 (25.8)	44.3 (27.7)	-3.0 (21.5)	0.1 (-0.0 to 0.3)
Global Pain	50.4 (24.5)	46.9 (26.6)	-3.4 (19.1)	0.1 (0 to 0.3)
ODI	39.1 (15.1)	35.0 (16.7)	-4.1 (7.7)	0.3 (0.2 to 0.4)
TSK	45.7 (7.9)	44.5 (9.3)	-1.2 (6.2)	0.2 (0.0 to 0.3)
SPS (logit)	0.0 (1.8)	0.2 (2.0)	0.2 (1.2)	0.1 (0.2 to -0.0)
FABQ-PA	13.9 (5.6)	13.5 (5.9)	-0.6 (4.5)	0.1 (-0.0 to 0.3)
FABQ-Work	29.2 (9.7)	28.1 (10.3)	-1.0 (7.0)	0.1 (-0.0 to 0.2)
CSQ Diverting Attention	14.5 (3.4)	14.0 (3.4)	-0.5 (2.9)	0.2 (-0.0 to 0.3)
CSQ Catastrophizing	9.8 (3.0)	9.4 (3.1)	-0.4 (2.2)	0.1 (-0.0 to 0.3)
CSQ Ignoring Pain	10.8 (3.3)	10.6 (3.5)	-0.2 (3.0)	0.1 (-0.1 to 0.2)
CSQ Reinterpretation	7.9 (3.2)	7.8 (3.2)	-0.1 (2.7)	0.0 (-0.1 to 0.2)
CSQ Praying / Hoping	7.3 (3.2)	6.7 (3.1)	-0.6 (2.0)	0.2 (0.1 to 0.3)
HADS Depression	7.6 (3.9)	7.0 (4.0)	-0.6 (2.5)	0.2 (0.0 to 0.3)
HADS Anxiety	10.6 (3.5)	9.8 (4.2)	-0.9 (3.2)	0.3 (0.1 to 0.4)
EQ5d-VAS	50.7 (20.7)	53.7 (22.2)	3.0 (20.3)	0.1 (0.3 to -0.0)
EQ5D-FR-Utility Index	0.5 (0.3)	0.5 (0.3)	0.0 (0.2)	0.1 (0.3 to 0)

sd = Standard deviation, ODI = Oswestry Disability Index, OMPSQ = Orebro Musculoskeletal Pain Screening Questionnaire, TSK = Tampa Scale for Kinesiophobia, SPS = Situational Pain Scale, FABQ-PA = Fear Avoidance Belief Questionnaire, subscale for physical Activity, FABQ-Work = Fear Avoidance Belief Questionnaire, subscale for work. CSQ = Coping Strategies Questionnaire.

Table 4. A-priori stated hypotheses for the responsiveness. Part I: Correlations for the changes between baseline and discharge

Correlation	Spearman's Rho (95% CI)	Hypothesis confirmed
OMPSQ - PGIC	0.33 (0.15 to 0.49)	Yes
OMPSQ - HADS-Anxiety	0.25 (0.07 to 0.42)	Yes
OMPSQ - HADS-Depression	0.13 (-0.06 to 0.31)	No
OMPSQ - FABQ-Physical-Activity	0.18 (-0.01 to 0.36)	No
OMPSQ - FABQ-Work	0.18 (-0.01 to 0.35)	No
OMPSQ - Tampa Kinesiophobia Scale	0.26 (0.08 to 0.43)	Yes
OMPSQ - Coping Strategy Diverting Attention	-0.07 (-0.26 to 0.12)	Yes
OMPSQ - Coping Strategy Catastrophizing	0.12 (-0.07 to 0.3)	Yes
OMPSQ - Coping Strategy Ignoring Pain	-0.15 (-0.33 to 0.04)	Yes
OMPSQ - Coping Strategy Reinterpretation	-0.16 (-0.34 to 0.02)	Yes
OMPSQ - Coping Strategy Praying /Hoping	-0.02 (-0.2 to 0.17)	Yes
OMPSQ - Worst Pain	0.24 (0.06 to 0.41)	Yes
OMPSQ - Oswestry Disability Index	0.50 (0.35 to 0.63)	Yes

OMPSQ = Orebro Musculoskeletal Pain Screening Questionnaire; PGIC = Patient's Global Impression of Change; HADS = Hospital Anxiety and Disability Scale; FABQ = Fear Avoidance Beliefs Questionnaire

Table 5. Changes in Orebro Musculoskeletal Pain Screening Questionnaire per response category of the Patient's Global Impression of Change scale

All 111 patients with values at baseline and discharge		
PGIC Category	N per group (% of all)	mean (sd)
very much improved	7 (6%)	-27.58 (17.87)
much improved	25 (23%)	-13.84 (22.52)
minimally improved	35 (32%)	-5.66 (13.89)
no change	25 (23%)	-7.53 (20.37)
minimally worse	6 (5%)	1.42 (9.93)
much worse	11 (10%)	3.55 (9.47)
very much worse	2 (2%)	-6 (9.9)

PGIC = Patient's Global Impression of Chang scale; sd = standard deviation
Part II of the a-priori stated hypotheses for responsiveness.